

Dominant Epistasis (12:3:1)

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It is found for fruit colour viz white, yellow and green.

White colour is controlled by dominant gene W and yellow colour is controlled by dominant genes G .

White is codominant over both yellow and green. The green fruits are produced in recessive condition ($wwgg$). A cross between plants having white and yellow fruits produce white F_1 fruits.

Selfcrossing of F_1 plants produce plants with white, yellow and green coloured fruits in F_2 generation in 12:3:1 ratio.

Here W is dominant to w and epistatic to alleles G and g . Hence, it masks the expression of G and g alleles. In F_2 plants with $W-G-$ (9:16) and $W-gg$ (3:16) genotypes produce white fruits; plants with $wwG-$ 3/16 produce yellow fruits and those with $wwgg$ 1/16 genotype produce green fruits. Hence, normal dihybrid ratio 9:3:3:1 is modified into 12:3:1 ratio in F_2 generation. This type of gene interaction has also been reported for skin colour in mice and seed coat colour in barley.

Parents	White fruit	x	Yellow fruit
Genotype	$WWgg$	x	$wwGG$
F_1	$WwGg$		White fruit

♀ \ ♂	WG	Wg	wG	wg
Wg	WWGG (W)	WWGg (W)	WwGG (W)	WwGG (W)
Wg	WWGg (W)	WWgg (W)	WwGg (W)	Wwgg (W)
WG	WwGG (W)	WwGg (W)	wwGG (Y)	WwGg (Y)
Wg	WwGg (W)	Wwgg (W)	wwGg (Y)	wwgg (G)

F2 Ratio = 12 White : 3 Yellow : 1 Green